BUILDING RESILIENCE FOR FOOD & NUTRITION SECURITY

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BUILDING RESILIENCE TO CONFLICT THROUGH FOOD-SECURITY POLICIES AND PROGRAMS

EVIDENCE FROM FOUR CASE STUDIES

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ABSTRACT

Food insecurity at the national and household level not only is a consequence of conflict but can also cause and drive conflicts. This paper makes the case for an even higher priority for food security–related policies and programs in conflict-prone countries. Such policies and programs have the potential to build resilience to conflict by not only helping countries and people cope with and recover from conflict, but also contributing to preventing conflicts and supporting economic development more broadly—that is, helping countries and people become even better off. Based on this definition and a new conceptual framework, the paper offers several insights from four case studies on Egypt, Somalia, Sudan, and Yemen. First, conflicts are often related to other shocks such as economic crises, price shocks, and natural disasters. Second, increasing subsidies is a favored policy measure in times of crisis; however, such measures do not qualify as resilience building. Third, climate change adaptation should be an integral part of conflict prevention in part because climate change is expected to significantly increase the likelihood of conflict in the future. Fourth, building price information systems, introducing and expanding credit and insurance markets, geographic targeting of social safety nets, and building functioning and effective institutions are key measures for building resilience to conflict. Finally, the paper points to several important knowledge gaps.

Keywords: resilience, conflict, food security, food subsidies, climate change, Arab world, Egypt, Sudan, Somalia, Yemen

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1. INTRODUCTION: FOOD INSECURITY AS CONSEQUENCE AND CAUSE OF CONFLICT

> *"Most wars of the late 20th century and early 21st century are 'food wars,' meaning that food is used as a weapon, food systems are destroyed in the course of conflict, and food insecurity persists as a legacy of conflict."* (Messer and Cohen 2006, 1)

One and a half billion people still live in fragile, conflict-affected areas. People living in these countries are about twice as likely to be malnourished and to die during infancy as people in other developing countries (World Bank 2011a). This outcome is often a direct consequence of conflict: conflict reduces food availability by impacting agricultural production through the destruction of agricultural assets and infrastructure (Deininger and Castagnini 2006; FAO 2000). Conflict also often destroys physical infrastructure and increases the security risks associated with its use to access the (food) markets, thus driving up local food prices.

This negative impact on food availability (or national-level food security) goes hand in hand with the detrimental impacts of conflicts on household-level food security, particularly on key determinants of food insecurity such as nutrition, health, and education (Collier and Hoeffler 2004). More recently, Akresh, Verwimp, and Bundervoet (2010) estimated the effects that the Rwandan genocide had on malnutrition (child stunting) through regional variation in conflict. Bundervoet, Verwimp, and Akresh (2009) found that in Burundi an additional month of war exposure decreased children's height-for-age z-scores by 0.047 standard deviations, compared with nonexposed children.[1] Detrimental effects on health have also been found in Côte d'Ivoire. Minoiu and Shemyakina (2012) found that children exposed to conflict either in utero or during early life had height-for-age z-scores 0.489 standard deviations lower than those born in nonaffected regions during the same period. In another setting, D'Souza and Jolliffe (2013) highlighted the negative correlation between the levels of conflict in Afghanistan and food security (after controlling for household characteristics and key commodity prices) measured by insufficient calorie intake or real food consumption. The damage done in early life persists and explains several outcomes in adulthood (Aguero and Deolalikar 2012; Akresh et al. 2012; Akresh, Lucchetti, and Thirumurthy 2012; Dominguez and Barre 2013). Another strand of the literature further sheds light on the long-term damages for children experiencing conflict-related shocks in utero (Camacho 2008; Minoiu and Shemyakina 2012; Akresh et al. 2012; Akresh, Lucchetti, and Thirumurthy 2012; Mansour and Rees 2012). Recent evidence has also emphasized the detrimental impact of war on education outcomes in very diverse case studies. Based on household data in Rwanda, Akresh and de Walque (2010) suggested that school-age children who have been exposed to genocide experience a drop in educational achievement of almost one-half year of completed schooling and are 15 percentage points less likely to complete third and fourth grades.[2] Blattman and Annan (2010) exploited forced recruitment data in Uganda to show that child soldiering decreases schooling by nearly a year and has detrimental consequences on future employment and earnings. Adelman, Gilligan, and Lehrer (2010) explored the mixed impacts of displacement on education outcomes in Uganda and found most impacts were negative. But the evidence is not restricted to African countries. According to Shemyakina (2011), violence in Tajikistan had detrimental impacts on the education of girls, with long-term adverse effects on wages and life chances, while de Walque (2006) found that individuals who were of secondary school age during the Khmer Rouge period in Cambodia have many fewer years of schooling than other cohorts. In Central America, Chamarbagwala and Moran (2011) further stressed the vulnerability of most disadvantaged groups (rural Mayans) in Guatemala. Rural Mayans who had been heavily exposed to the 36-year-long civil war in Guatemala completed many fewer years of education compared with

[1] Adelman, Gilligan, and Lehrer (2010) also found large effects of displacement in northern Uganda. Specifically, children born one year after being displaced because of conflict had significantly lower height-for-age z-scores (by 0.8 z-scores) than those born at least three years before displacement.

[2] Note that Guariso and Verpoorten (2013) expressed strong doubts about the validity of these results.

those who were not of school age during the civil war. In particular, males and females had, respectively, 23 percent and 30 percent less schooling if exposed to conflict between 1985 and 1996. All this evidence further stresses the long-term consequences of conflict on human capital and the burden disproportionately borne by the poor during times of conflict.

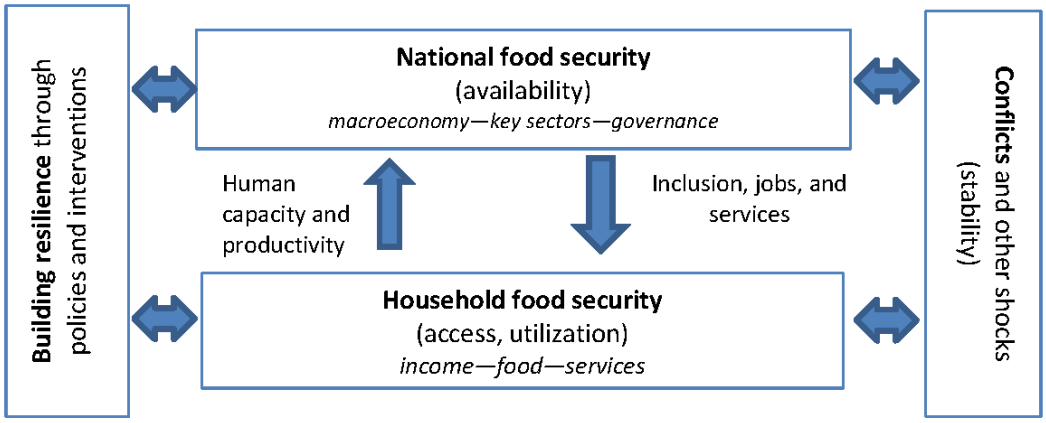
Not only is food insecurity a consequence of conflict, but it can also fuel and drive conflicts. Traditionally, poverty (Miguel, Satyanath, and Sergenti 2004; Blattman and Miguel 2010); underemployment of young men (De Soysa et al. 1999; Collier and Hoeffler 2004; Taeb 2004); inequalities in income, land, and natural resources (Auvinen and Nafziger 1999; Stewart 2000; Macours 2011)—often combined with population pressures (Ostby et al. 2011), geographic characteristics (for example, mountainous terrain), the presence of high-value natural resources (Dube and Vargas 2013; Maystadt et al. 2013), and poor governance (Collier and Hoeffler 2004; Fearon 2010)—have been shown to be key drivers of conflict. More recently, *food insecurity* has also been singled out as a source of conflict by Brinkman and Hendrix (2011) and Pinstrup-Andersen and Shimokawa (2008), especially in the presence of ill-defined political regimes, a *youth bulge*, stunted economic development, slow or falling economic growth, and high inequality among groups. In particular, increases in food prices have been found to strongly exacerbate the risk of political unrest and conflicts (Arezki and Brückner 2011; Bellemare 2011). For example, food riots often occurred as a response to higher food prices in Egypt during the 1970s and in Jordan and Morocco during the 1980s and 1990s (McDermott 1992; Walton and Seddon 1994; Adoni and Jillian 1996). More recently, the 2007–2008 global food crisis sparked rioting in 48 countries. In some cases, this had severe political consequences, such as the resignation of Haiti's Prime Minister Alexis and the coup against President Ravalomanana of Madagascar in 2009 (Brinkman and Hendrix 2011). Shortly before the Arab awakening, Bahrain, Yemen, Jordan, Egypt, and Morocco saw demonstrations about food in 2008 (*Economist* 2012). In fact, Maystadt, Trinh Tan, and Breisinger (forthcoming) showed that food insecurity at the national and household levels is a major cause of conflict in Arab countries—more so than in the rest of the world—supporting the widely believed view that food insecurity has been among the key factors that have sparked revolutions (Breisinger, Ecker, and Al-Riffai 2011; Breisinger et al. 2012). According to Maystadt, Trinh Tan, and Breisinger (forthcoming), one of the key explanations of this "Arab exceptionalism" is that all Arab countries are *net food importers* and the vast majority of people in them are net consumers of food, which makes Arab countries and their people highly vulnerable to global food price spikes such as those in 2008 and 2011.

These findings from the literature suggest that food insecurity can be both a consequence *and* a cause of conflict. Thus, food security perhaps ought to be allocated an even higher priority in many conflict-prone countries because it not only is expected to support economic development but also may help in preventing conflicts. There is a broad literature on how to improve food security, including amendments in global trade rules that restrict the ability of food exporters to impose export bans, stricter rules on food commodity speculation, the institutionalization of grain reserves to stabilize prices in times of crisis, and the creation and expansion of national social safety mechanisms, in addition to a boost in investments to raise agricultural productivity and adapt sustainably to a changing climate (World Bank, FAO, and IFAD 2009; Fan, Torero, and Headey 2011; Ecker and Breisinger 2012). However, only a few papers discuss food security in the context of violent conflict, and those that do mostly analyze the issue from a more global perspective (for example, Brinkman and Hendrix 2011; Pinstrup-Andersen and Shimokawa 2008). To shed more light on the country-specific links between conflict and food security, and related food-security policies and interventions to enhance resilience, this paper presents a set of four case studies. To embed these case studies into a common frame, Section 2 of the paper presents a framework that conceptualizes the links between resilience, conflict, and food security. Based on this framework, Section 3 presents the four case studies. Section 4 concludes and suggests areas for further research.

2. BUILDING RESILIENCE TO CONFLICT THROUGH FOOD-SECURITY POLICIES AND PROGRAMS: A CONCEPTUAL FRAMEWORK

Section 1 of this paper has shown that food insecurity can be a cause and a consequence of conflict. Based on this finding from the literature and in order to conceptualize the key links between resilience, conflict, and food security, Figure 2.1 presents a framework in which building resilience to conflict is defined as "helping countries and households to prevent, anticipate, prepare for, cope with, and recover from *conflicts*, and not only bounce back to where they were before the *conflicts* occurred but become even better off" (adapted based on IFPRI 2020 policy consultation).[3] In this framework, conflicts are one specific type of shock that hits food security at both the national and household levels. Conflicts can be defined as "organized violence [including] the use or threat of physical force by groups. These include state actions against other states or against civilians, civil wars, electoral violence between opposing sides, communal conflicts based on regional, ethnic, religious, or other group identities or competing economic interests, gang-based violence and organized crime and international non-state armed movements with ideological aims" (World Bank 2011a, xv).[4] It is important to stress that conflicts often occur together with other shocks (for example, other conflicts, natural disasters, price shocks, and so on). The interdependencies between shocks (such as droughts occurring in the context of conflict) often lead to "complex emergencies."

Figure 2.1 The conflict resiliency–food security framework



Source: Authors' illustration based on Ecker and Breisinger (2012).

To illustrate how resilience to conflict can be built through food-security policies and programs, the framework in Figure 2.1 differentiates between national- and household-level food security (Ecker and Breisinger 2012). National-level food security refers to the "availability" dimension and exists when a country is able to either produce, import, or store sufficient food for all people at all times. National food security is a precondition for household food security. Household-level food security is a situation "when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996, 2). Resilience at the national level is mainly built through policies and investments and is a precondition for resilience at the household level. Household-level resilience can be further enhanced through specific programs, either from governments or from international partners.

[3] More information is available at http://www.2020resilience.ifpri.info/about/.

[4] This paper will mainly focus on civil conflict.

More specifically, building resilience to conflict through food-security policies at the *national level* is mainly related to macroeconomic stability, sector policies, and governance. Beyond the impact of macroeconomic policies on economic welfare and its redistribution, governance encompasses the *polity* determinants of conflict resilience. The polity dimension relates to the ability of the state to include the people in policy- and decisionmaking processes and to provide adequate services to the people. Recent evidence has indeed shown the importance of having inclusive institutions for political stability (Acemoglu and Robinson 2012; Besley and Persson 2011). Examples of well-implemented policies include public spending that supports economic growth and job creation, institutions that include people in the process of governing (in contrast to extractive institutions that allow a small group to exploit the rest of the population), and social safety nets that are targeted to the poor (Breisinger et al. 2012). Countries with weak governments are often not only worse off in terms of development but also more vulnerable to shocks. For example, protests were more frequent and more likely to turn violent during the 2007–2008 food price crisis in countries with the most fragile governments (World Bank 2011a).

Building resilience to conflict at the *household level* will have to address factors related to the *motivation* to participate in conflicts and the *opportunity costs* to do so. Motivation is embodied in the grievances of certain population groups and often relates to discrimination and inequality (Brinkman and Hendrix 2011), or in other words, the extent to which people are included in the development process. Whether individuals and groups participate in conflict or not also depends on their opportunity costs, which are largely determined by the socioeconomic conditions prior to the onset of conflict, including levels of income and households' access to food and services. Examples of food-security policies and interventions that address the motivation- and opportunity-related factors include policies and programs that create employment for the poor, targeted social safety nets, and specific health and nutrition programs.

Given that resilience-enhancing food-security policies and programs are highly context specific, the next section applies the framework to four selected countries: Yemen, Egypt, Somalia, and Sudan.

3. FOOD-SECURITY POLICIES AND INTERVENTIONS: LESSONS FROM FOUR CASE STUDIES

Based on the literature, the conceptual framework has emphasized that (1) conflicts (often in combination with other shocks) affect food security at the national and household levels, (2) food insecurity can drive conflict, and (3) building resilience to food insecurity has the potential to reduce conflict. Importantly, the related discussion of *polity* determinants of conflict mainly relates to national-level food-security policies, and the *motivation*- and *opportunity*-related factors apply more to household-level food-security programs. Obviously, the two dimensions cannot always be clearly separated, and surely national-level food security is often a precondition for household-level food security.

For the case studies, we have chosen four conflict-affected countries, one of which is a lower-income country (Somalia) and three of which are lower-middle-income countries (Egypt, Sudan, and Yemen). Yemen and Egypt are examples of "complex emergencies"—that is, both countries have experienced a series of economic shocks, which may have contributed to conflict. In those two cases, we focus mainly on describing the impact channels of conflict on food security and present selected policy reform options. The other two countries (Sudan and Somalia) have been in conflict for many years. In those cases, we focus on the causes of conflict (at the local level) and program-level interventions for enhancing resilience to conflict.

YEMEN: BUILDING RESILIENCE TO CONFLICT THROUGH BETTER GOVERNANCE AND IMPROVED FOOD SECURITY

Yemen has seen a variety of conflicts over the past decade, including the insurgency by the Houthis in the north of Yemen, the emergence of Al Qaeda–linked activities, and a movement in the former South Yemen demanding more autonomy or even independence. As a consequence, an estimated 41 percent of the people in the country were directly affected by conflict in 2013 (CRED 2013). In addition, the country had been hit by a series of economic shocks, including the triple global crises in 2007–2008 and the food price spike in 2011 (Breisinger, Ecker, and Al-Riffai 2011). These political, social, and economic crises, compounded by the Arab awakening in Tunisia, Egypt, and other countries, culminated in the first major demonstration in Yemen, with more than 10,000 people in Sana'a on January 27, 2011 (BBC 2012a, 2012b, 2012c).

Throughout 2011, conflicts in various parts of the country led to disruptions in the supply of production inputs, and related higher prices were transmitted across all economic sectors. Overall, the consumer price index rose by 22.7 percent in 2011, compared with 12.5 percent in 2010 (IMF 2013), including a significant rise in food prices (Yemen, MoPIC 2012). This rise in food prices apparently occurred due to reduced domestic supply and reduced imports, and was exacerbated by transportation and distribution disruptions due to the conflict situation and the deficient physical infrastructure, both factors that adversely affected the overall supply chain. The reduction in availability of fuel, particularly diesel, further aggravated shortages in electricity and water. Power cuts became so frequent that in some areas of Yemen power was available for only four hours out of the day (Yemen, MoPIC 2012), if at all. Rising fuel costs led to countless production disruptions as well as steep increases in transportation costs, reaching, at times, 100 percent in urban areas and 200 percent in rural areas, compared with preconflict levels (Yemen, MoPIC 2012). Temporarily, domestic gas prices rose to three times their 2010 levels, gasoline prices by 600 percent, and diesel prices by up to 800 percent during 2011 (Yemen, MoPIC 2012). The repeated bombing of the pipelines in the Marib and Ras Issa areas and the persistent lack of security on the roads led to a sharp decrease in crude oil production, by about 25 percent in 2011, and further increased transportation costs (Yemen, MoPIC 2012).

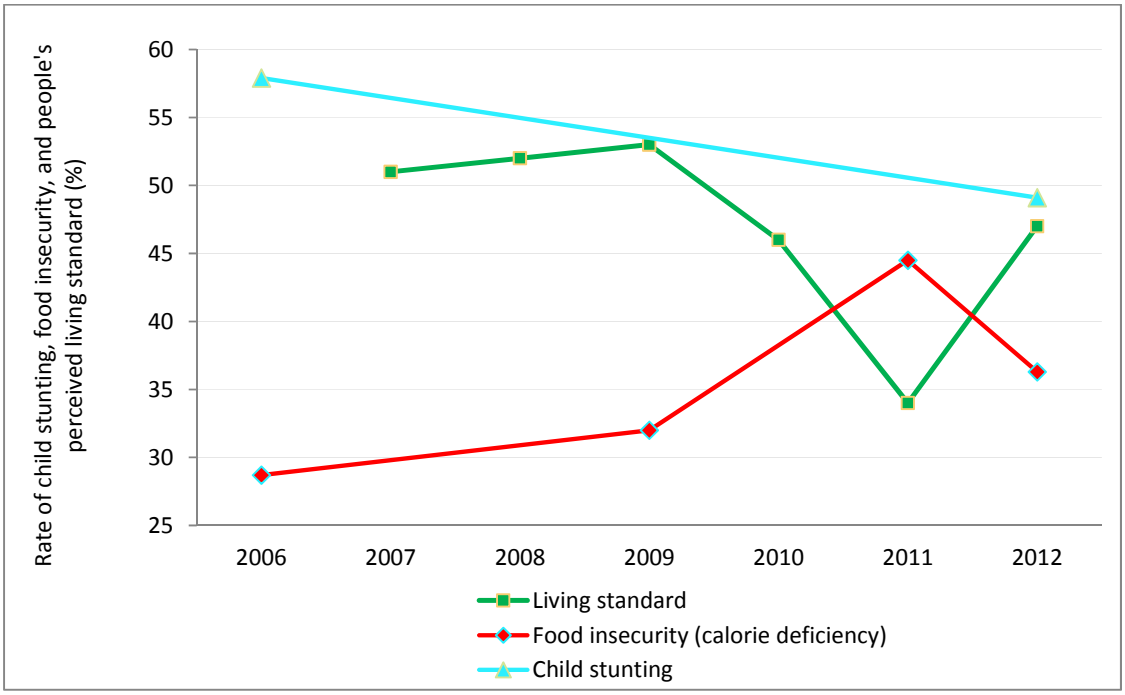
These disruptions had far-reaching repercussions throughout the economy. The agricultural, industrial, and service sectors faced significant cost increases for inputs such as irrigation, transportation, and marketing, ultimately reducing production and exports. Production processes were disrupted, leading businesses to close and causing workers to be let go in both public and private sectors. Delivery of public goods and services

(including health, education, and social safety nets) was adversely affected throughout Yemen (World Bank et al. 2012).

As a result, the conflict led to a sharp drop in economic growth in 2011, which contributed to an increase in poverty and food insecurity. Even before 2011, poverty and food insecurity levels in Yemen were the highest in the Arab world, with 32 percent of the population food insecure (Breisinger, Ecker, and Al-Riffai 2011). In 2009, an estimated 59 percent of all children were stunted (too short for their age), mainly due to poor nutrition and health. Findings of the World Food Programme (WFP) Comprehensive Food Security Survey suggested that in late 2011, 45 percent of the Yemeni population—more than 10 million people—suffered from food insecurity (WFP 2012), up from 32 percent in 2009 (Figure 3.1).

However, after the major conflict-related interruptions were eased, food security and per capita incomes started to rise again in 2012 after their steep fall in 2011. A variety of factors was behind this improvement: inflation declined to 9.9 percent from 19.5 percent in 2011, the exchange rate appreciated back to its precrisis level, international food prices moderated, and supply shortages eased (IMF 2013). In addition, subsidies and the public wage bill have increased to 9 percent and 11 percent of gross domestic product (GDP), respectively (IMF 2013); measures that help households, however, are not well targeted and are fiscally unsustainable.

Figure 3.1 Food security in Yemen is improving again after a succession of crises



Source: Authors' compilation based on data from Yemen, CSO (2013); Gallup (2013); IPC-IG et al. (2013); and WFP (2013).

The positive relationship between the levels of conflict and food security was also confirmed by findings from Ecker (2014). Using a small-scale social protection monitoring survey carried out by UNICEF, the author found a close co-movement between the prevalence of food-insecure households and the prevalence of households affected by conflict. Ecker's findings also suggested that the food security situation has drastically worsened even in areas that were not directly experiencing violent clashes, mainly as a result of the influx of internally displaced people, price surges, and severe fuel shortages.

The data show that not only have Yemen's economic conditions been deteriorating since the second half of 2009, but also people's confidence in most local institutions has dropped sharply since then (Table 3.1). Confidence in the national government plummeted in the course of the recent uprisings. In 2011, less than 40

percent of the adult population had confidence in the national government. Another indication for increasing government failure in providing security, fostering inclusiveness, and facilitating social equity is the degree of protection of minorities. In 2011, only 12 percent of the Yemeni adult population considered their city or area a good place to live for racial and ethnic minorities. Furthermore, since the first Gallup survey in 2007, confidence in most state and state-controlled institutions was at a record low, even more so than its already low levels before the recent political crisis. In addition to that, in 2011, less than (or close to) 40 percent of the adult population had confidence in local police, financial institutions, and the media, and less than 30 percent had confidence in the judicial and healthcare systems, and the honesty of elections. The vast majority of people seemed to trust only religious institutions and—at least until mid-2011 and to a much lesser extent—the military. Compared with 2009, confidence in all state and state-controlled institutions has declined significantly, with the exceptions of the media and, perhaps surprisingly, the judicial system. Strikingly, people lost the most confidence in the national government directly and its ability to conduct fair elections, whereas religious institutions gained people's confidence. Overall, the Gallup survey data consistently suggest a strong trend of governance erosion.

Table 3.1 Confidence in state, state-controlled, and religious institutions (percent of adults) in Yemen, 2011

	2011	Change from 2009
National government	39	–16
Honesty of elections	29	–14
Judicial system	28	6
Financial institutions	38	–4
Healthcare	29	
Local police	39	–8
Military	65	–3
Religious organizations	88	5
Media	41*	8

Source: Based on Gallup (2013).
Notes: * 2010 estimate. The presented estimates are based on the following question and answer: "In this country, do you have confidence in each of the following, or not? How about …?"—"Yes."

Therefore, in the words of the Joint Social and Economic Assessment, "Building capable institutions is essential for preventing future sources of conflict, and managing tensions and other stresses. In the case of Yemen, reducing corruption and improving accountability and transparency, while at the same time dealing with the pluralistic nature of Yemeni society in an equitable fashion, will be critical in addressing some of the issues that exacerbated tensions and shaped the nature of the 2011 crisis" (World Bank et al. 2012, 3).

In addition, building resilience to conflict in Yemen will mean not only bouncing back from the 2011 conflicts but using the transition period as an opportunity to become better off. In fact, Yemen has made much progress toward a more peaceful future by successfully concluding the National Dialogue Conference in early 2014. In the words of the UN special advisor for Yemen, Jamal bin Omar, "It is a historic moment for Yemen … after being on the brink of civil war, Yemenis negotiated an agreement for peaceful change, the only such [agreement] in the region," he said. "The National Dialogue established a new social contract and opened a new page in the history of Yemen, breaking from the past and paving the way for democratic governance founded on the rule of law, human rights and equal citizenship" (quoted in Kechichian 2014, n.p.). He also reaffirmed the continued support of the international community for the Yemeni-led transition process.

To support this process and to derive recommendations on how to enhance resilience to conflict in Yemen through food-security policies, this section presents the key findings of the National Food Security Strategy, developed by the government of Yemen in a consultative process and supported by international partners such as the European Union, German Society for International Cooperation (GIZ), International Food Policy Research Institute (IFPRI), and World Bank (Yemen, MoPIC, and IFPRI 2011). The seven-point action plan can

be divided—consistent with the framework—into measures that relate more to national-level food security (1–4) and measures that relate more to household-level food security (5–7).

1. *The government of Yemen made a first step toward reforming petroleum subsidies by increasing fuel prices in 2010 and reallocating these savings to where they are more needed*. However, simply phasing out the petroleum subsidy could increase food insecurity because higher fuel prices may affect farmers and the urban food insecure most. To protect food security during the reform period—and even improve it—the ample budgetary savings from reform could be used to finance a combination of direct transfers and productivity-enhancing investments. Transfer payments alone only curb the rise in food insecurity in the short run, but the addition of public investments in infrastructure (related to utilities, transportation, trade, and construction) fosters food security and sustainable economic growth. The combination of direct transfers and investment is a promising strategy for joining the subsidy reform with the promotion of sustainable development. Transfers, investments, and resulting long-term productivity gains complement each other and lead to reduced food insecurity and poverty.

2. *Improving the investment climate often involves political commitment to reform rather than financial resources, which makes it an attractive and low-cost option for accelerating growth, reducing poverty, and improving food security*. Yemen ranks in the bottom half of countries in creating a favorable investment climate (World Bank et al. 2012), with several key indicators significantly below the international average. While Yemen ranks high in its favorability for starting a business and dealing with construction permits, improvements are needed in access to credit, investor protection, and tax requirements in order to unleash private sector–driven growth, especially in promising sectors. It is important to note that in order to be pro-poor and pro–food insecure in the long run, growth needs to be both socially and environmentally sustainable. Social sustainability means that benefits from growth need to be shared widely among the population. Environmental sustainability is especially important for Yemen given its fragile natural resource base, especially water and land.

3. *Agriculture, which can make an important contribution to rural development and food security, is constrained by the lack of water; water scarcity and contamination threaten the health of many households*. And in all of this, *qat*, a stimulating drug, emerges as the major culprit, consuming more than 40 percent of Yemen's water supply. Thus, sharply reducing qat consumption is vital for avoiding the adverse results of drought, achieving nonqat agricultural growth, and meeting Yemen's food security goals. However, measures to reduce qat consumption may meet sharp resistance from the Yemeni people. Policy measures will require a communication campaign to provide comprehensive information on the necessity and urgency of these measures. The benefits of a qat tax will likely outweigh the difficulties of implementation: it is likely to discourage people from excessive consumption, allow Yemen to use its water supply more effectively, and generate additional revenue for the government—all of which should make the population more food secure. The tax revenue should be invested in agriculture and water infrastructure, and used for promoting alternatives to qat production, such as cereal and coffee production, and processing of agricultural products.

4. *Yemen is very vulnerable to global food price shocks and disasters, so the country must develop appropriate risk management mechanisms*. First, the cereal import market must be made more competitive. Currently, the market is dominated by a small number of importers, a situation that increases local cereal prices even in relatively stable economic circumstances. Appropriate laws and regulations that increase competitiveness will make an important contribution to improving food security. Second, the government should hedge against extreme price fluctuations caused by emergency situations such as the 2007–2008 global food crisis. This can be achieved through national as well as regional grain reserves, or hedging in international markets. For any type of price risk management, an effective market price monitoring system will be critical for effective decisionmaking. Third, the government should recognize the role of social transfers in building

economic resilience among vulnerable communities. Social transfers can include direct transfers, cash-for-work programs, community asset building through public works, assistance in starting microenterprises, and nutrition and health programs. The government should use the political opportunities that arise from food price crises and disasters to incorporate risk management into the overall economic development planning framework. Strong collaboration among governmental agencies, the private sector, and Yemen's international partners is conducive to success.

5. *Water tables are quickly falling, and water quality and accessibility are substandard; therefore water-sector reform is crucial for achieving the country's food-security goals and sustaining accelerated development*. Yemen's future food security depends heavily on reducing overall groundwater use and redistributing water used for agriculture to more productive economic activities and human consumption. Important steps toward efficient and sustainable water management are (1) strengthening capacity for and implementation of integrated water-resources management, including groundwater monitoring and control, and improved water quality; (2) managing environmental impacts, including promoting environmental protection and building partnerships with the private sector on effluent water and wastewater; (3) developing water-resource and water-use efficiency by protecting user rights; (4) delivering efficient, low-cost projects driven by demand through enhancing the efficiency of project implementation, improving coordination, and decentralizing; (5) strengthening institutions to allow them to play their role in promoting efficient water use; and (6) enhancing resource sustainability and quality through improved watershed management.

6. *A comprehensive public investment review should be conducted to better align public investments with Yemen's development objectives in general and its food-security strategy in particular across sectors and governorates.* During recent years, Yemen has underspent on infrastructure, agriculture, and health. From a spatial perspective, public spending across governorates does not seem to be aligned with poverty and food-security levels, indicating a lack of efficiency and targeting. Once the right amount of money is being directed to the places that need it most, the government must focus on how the money is being used. Often, physical infrastructure exists but the services provided are not satisfactory. Evaluation and monitoring of the quality of service provision and the efficiency of investment across all sectors will thus be needed for better outcomes. However, additional investment is also required, particularly to upgrade the rural drinking water supply and rural roads. Key services to target include programs related to education, nutrition, and family planning.

7. *The Yemeni government is advised in the action plan to launch three national campaigns at the highest political level (for example, as "presidential campaigns").* First, a national family planning program should be implemented. Such a program should be strongly integrated with primary healthcare and should involve religious leaders. Second, a high-level campaign should be launched to address the lack of nutrition and health knowledge among Yemenis. This nutritional education program should cover a wide range of topics, including dietary diversity and micronutrient malnutrition. Third, a campaign should focus on the acceleration of women's empowerment. The evidence clearly shows that gender inequality goes hand in hand with malnutrition. The campaign should focus on improving women's educational attainment, economic participation, health status, and political empowerment. The design of these programs, like all other policymaking processes, should increasingly include civil society groups to assure their maximum impact and outreach.

Implementing the National Food Security Strategy (NFSS) will require not only financial support from international partners but also strong Yemeni institutions capable of managing and coordinating multisector policies and investments. Positive steps in that direction were recently taken with the establishment of the Yemeni Food Security Supreme Council in May 2013 and the setting up of the related Technical Food Security Secretariat housed by the Ministry of Planning and International Cooperation in September 2013. Progress has also been made toward financing the implementation of the NFSS through a US$36 million grant that Yemen secured under the Global Agriculture and Food Security Program. Going forward, results of this case study

suggest that improving food security will not only make Yemenis economically better off but may also enhance their resilience to conflict.

EGYPT: BUILDING RESILIENCE TO CONFLICT THROUGH FOOD POLICY REFORM[5]

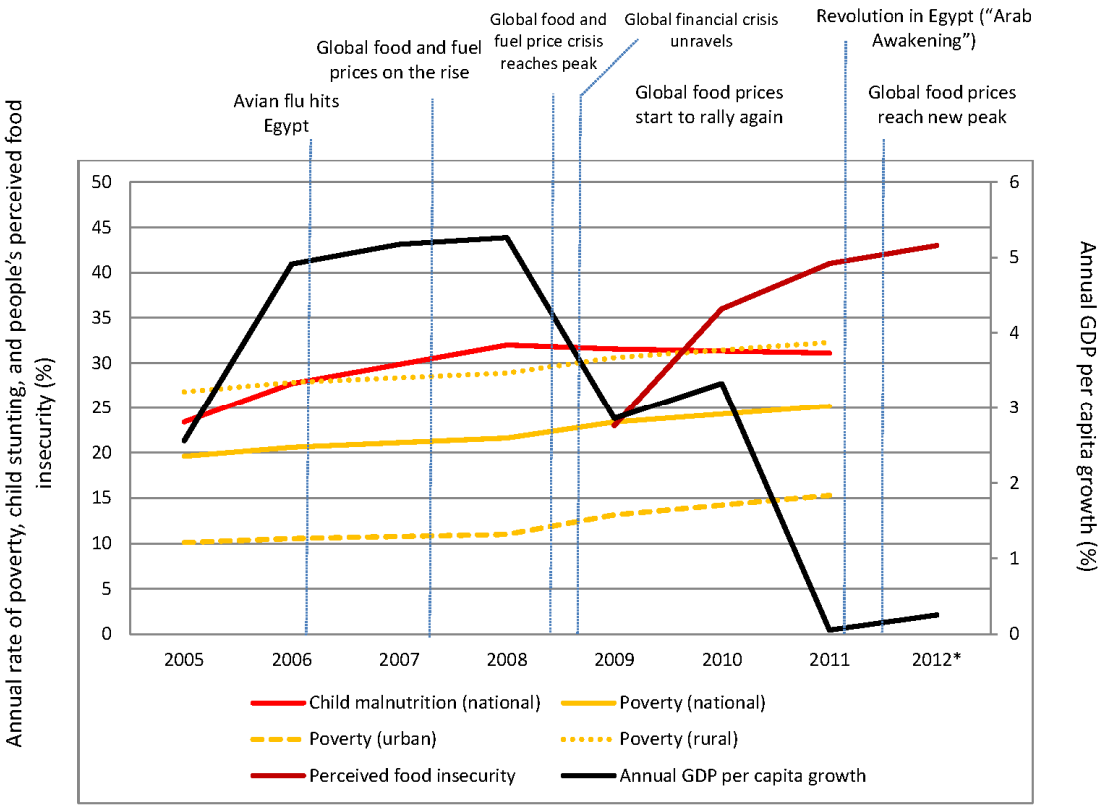
When the revolution in Egypt started in January 2011, "bread," "dignity," and "social justice" were among the widely chanted slogans on Tahrir Square and beyond. This is only one indication that *polity-, opportunity-*, and *motivation*-related factors, including food insecurity, have all contributed to the uprisings that culminated in the ousting of the Mubarak regime. While few observers had anticipated a revolution and ensuing conflict, the economic and food-security situation started to deteriorate as early as 2005 owing to a succession of crises and worsening poverty. These crises included the avian influenza epidemic in 2006; the food, fuel, and financial crises of 2007–2009; a further rallying of global food prices starting in late 2010; and the challenging macroeconomic context that followed political instability in the wake of the 2011 revolution and ensuing conflict (Figure 3.2).

Egypt's net food-importing status (that includes importing 45–55 percent of its wheat needs) makes it vulnerable to fluctuations in international food prices. Higher global food and fuel prices and lower foreign currency inflows from exports, tourism, foreign direct investment, and other sources, that have only partly been offset by increased remittances, have meant a widening of the balance-of-payments deficit. The challenging macroeconomic backdrop has adversely affected households. Economic growth on a per capita basis fell dramatically from an annual average of 4.5 percent between 2005 and 2008, to 3.1 percent between 2009 and 2010, to almost zero in 2011 and 2012, and was coupled with growing unemployment. Poverty has driven an increase in household food insecurity. Estimates from the 2010–2011 Household Income, Expenditure, and Consumption Survey (Egypt, CAPMAS 2011) show that income poverty increased from 19.6 percent in 2004–2005, to 21.6 percent in 2008–2009, to 25.2 percent (21 million people) in 2010–2011 (Figure 3.2). Between 2009 and 2011, 15.2 percent of the population (12.2 million people) fell into poverty, double the percentage of those who moved out of poverty (7.7 percent), and a further 12.6 percent of the population remained in chronic poverty. Child malnutrition has also reached very high levels. Chronic malnutrition among children started to rise as early as 2003, and by 2008 about one-third of Egyptian children younger than five were stunted. Since then, child malnutrition has remained high, indicating not only a delink between nutrition and economic growth, but also limited capacity of the health system to adequately and regularly detect, treat, and monitor malnutrition, especially in children younger than five (Breisinger et al. 2012).

One of the key government measures to protect households during crises is an extensive social safety net that includes food subsidies. In fact, increasing subsidies and raising public-service wages were among the most widely used policy tools of Arab governments (including Egypt) to respond to the Arab awakening (Breisinger, Ecker, and Al-Riffai 2011). In Egypt, food subsidies are part of a variety of social safety net programs. They accounted for 1–2 percent of GDP during the past decade, compared with fuel subsidies that have accounted for 5–7 percent. Food subsidies are made up of two components: (1) ration cards that allow 80 percent of Egyptian households to buy set quotas of specific commodities at subsidized prices from specific outlets and (2) baladi bread sold at 5 piastres (about US$0.01 per loaf), for which there are no entitlement restrictions and distribution takes place on a first come, first served basis. Currently baladi bread makes up 61 percent of food subsidies, compared with 39 percent for ration card–based commodities.

[5] This section is based on a joint IFPRI–WFP Country Policy Note of May 2013: *Tackling Egypt's Rising Food Insecurity in a Time of Transition* (Breisinger et al. 2013). Authors of this note are, from IFPRI: Clemens Breisinger, Perrihan Al-Riffai, and Olivier Ecker; from the WFP Egypt country office: Riham Abuismail, Jane Waite, Noura Abdelwahab, and Alaa Zohery; from Cairo University: Heba El-Laithy and Dina Armanious.

Figure 3.2 Food security in Yemen is improving again after a succession of crises



Source: Authors' representation based on El-Zanaty and Way (2006, 2009); Egypt, CAPMAS (2011); Gallup (2013); Egypt, MoF (2013); and *Economist* Intelligence Unit (2013).
Notes: GDP = gross domestic product. * Projected for annual GDP per capita growth.

Food subsidies have played an important role in protecting the poor from the impact of high food prices during recent crises (World Bank 2010). Assuming no immediate substitution, a removal of food subsidies coupled with households' purchasing the equivalent nonsubsidized commodities would lead to an expenditure effect that could push national poverty estimates up from 25.2 percent to about 34 percent (Breisinger et al. 2013). This sizable effect on poverty occurs because subsidized food accounts for nearly one-fifth of poor households' food expenditure, and subsidized baladi bread accounts for 71 percent of bread consumed by poor households. Many Egyptians perceive food subsidies to be one of the key benefits made available by the government, and many perceive bread as a right.

But despite the high level of food subsidies, food insecurity and poverty are on the rise, contributing to the double burden of malnutrition. Rising poverty has resulted in increasing dependence on cheaper, calorie-dense food, including subsidized commodities, all of which have a correlation with obesity. Compounded by high food prices, changing lifestyles, and poor nutritional awareness, obesity in Egypt is on the rise, with an estimated 48 percent of women older than 15 being obese. The coexistence of obesity and stunting has added to the phenomenon of the double burden of malnutrition in Egypt, now among the highest in the world.

In addition, building the resilience of households goes beyond coping with and recovering from crises and conflicts. Building resilience also means households' becoming even better off compared with where they were before the onset of the conflict. Thus, in the current economic climate and the fragile security situation, in which government resources are constrained and rising poverty has meant growing food insecurity and

nutrition challenges, increasing efficiencies of the subsidy system can free up urgently needed resources.[6] Making the subsidy system more efficient would lead to savings that could be invested in more targeted food-security and nutrition interventions as well as job-creating initiatives in poorer areas. This in turn may contribute to creating more opportunities, especially for young people, thus reducing the motivation to participate in conflict. Table 3.2 shows a set of four food-subsidy policy options that are based on an extensive literature review and lessons from other countries, and that may be politically feasible and help in improving resilience to conflict through improved food security.

Table 3.2 Policy options and expected impacts on budget, poverty, and nutrition

Policy option	Possible time frame	Impact on budget deficit	Impact on poverty	Impact on infant nutrition
Follow business as usual	Not an option	–	+	N
Improve supply chain efficiency				
Improve storage	Short term	+	N	N
Reduce leakages	Medium term	+	N / +	N
Institute e-system	Long term	+	N / +	N
Improve targeting				
Include the most vulnerable	Medium term	–	+	+
Exclude the least vulnerable	Medium to long term	+	N	N
Use self-targeting	Medium term	+	N	N
Complement and substitute				
Targeted nutrition programs	Short to medium term	N / +	+	+
Income-generation programs	Short to medium term	N / +	+	N / +
Targeted cash/in-kind transfers	Medium term	N / +	+	N / +

Source: Authors' compilation.

Note: + = expected positive effect; – = expected negative effect; N = expected neutral effect.

Follow business as usual. Given Egypt's severe macroeconomic challenges and growing food insecurity, this scenario does not seem feasible. It also cannot be considered as "resilience building" because people are not expected to become better off.

Improve supply chain efficiency. Efficiencies in the subsidized baladi bread supply chain can be achieved through covering wheat stored in open bunkers (*shonas*) to reduce losses, packaging and labeling bread, and introducing model bakeries. Management of the strategic inventory of wheat could be shifted to the General Authority for Supply Commodities, and additional silos could be built in key locations—potentially by the private sector—to facilitate such management. Liberalization of wheat prices should continue in line with recent government pilots. These recommendations allow for considerable savings at relatively low cost. More costly in the short term but with potentially sizable long-term savings are government plans to replace ration cards with smart national ID cards, including those for bread, that would improve monitoring and reduce ghost users; these reforms would not be without political challenge given sizable vested interests. The government should continue its program of fortifying subsidized wheat flour with iron and folic acid and fortifying subsidized cooking oil with vitamins A and D; roll out fortification to the commercial sector; and revise and enforce food-quality standards, particularly for wheat flour and baladi bread.

[6] Losses and leakage across the baladi bread supply chain, for example, are estimated at 30 percent. The ration card system also suffers from poor and limited targeting; it covers 80 percent of the population, including 73 percent of nonpoor households, but excludes 19 percent of the most vulnerable households. Moreover, fuel subsidies that account for more than one-fifth of the budget and 6 percent of GDP provide an even more sizable opportunity for efficiency savings.

Improve targeting. Self-targeting through mandatory registration could discourage better-off households from using the food subsidy system. Targeting could also be improved by clarifying targeting criteria, regularly updating the database to include newborns and exclude those who have died, using geographic targeting for Upper Egypt, and targeting according to households' poverty characteristics (proxy means testing) for urban areas and Lower Egypt. These targeting practices would save resources and contribute to improved food security. Furthermore, although the most food-insecure groups would continue to receive full ration entitlements to subsidized commodities, the least vulnerable could be moved to partial rations for baladi bread and ration cards that could be gradually phased out.

Complement and substitute. Targeted nutrition interventions focusing particularly on maternal and child nutrition could be introduced. Vouchers could be used for specific commodities and target groups, such as pregnant and lactating women, to aid access to wider dietary diversity. The most vulnerable groups prefer in-kind transfers, particularly in circumstances of high inflation and low market access, whereas cash transfers could be used for the relatively better off and in areas with good market access. Finally, conditional cash transfers, vouchers, or both for education or health services could be used to top up in-kind assistance to the most vulnerable. In the longer term they could replace subsidies and be linked to price indexes, particularly for food, to counter the effects of inflation.

Implementing this reform agenda can be expected to improve the resilience of households both directly and indirectly: directly by reducing poverty and food insecurity, and indirectly by investing budget savings into programs that enhance people's opportunities. However, lessons from Egypt's own history and that of other countries suggest that changing the subsidy system can meet significant resistance and in fact stir conflict and uprisings. Therefore, creating an understanding (Why should the rich get subsidies?) and managing expectations (What are people getting in return?) could be critical for success. In addition, a monitoring and evaluation system is needed to inform decisionmaking, and policymakers need to learn and adjust accordingly during the reform process. Finally, in the authors' opinion, subsidy reform is likely to be most successful if it is viewed in the broader context of resilience and is integrated into a national strategy for development and food security.

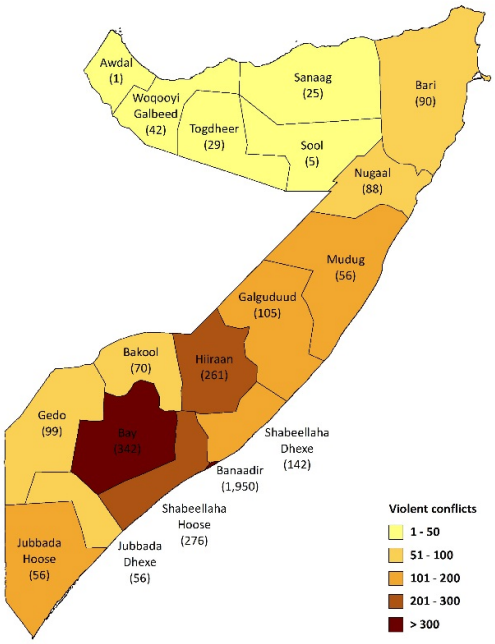
SOMALIA: DROUGHT, LIVESTOCK PRICE SHOCKS, AND CIVIL WAR

From 1969 to 1991, Somalia was ruled in an autocratic manner by Mohammed Siad Barre, with strong external support from the Soviet Union until 1978 and the United States thereafter. Following the end of the Cold War, the external support faded, leading to a violent civil war and the collapse of the national government in 1991. Since then no central government has controlled the entirety of the country. Somalia has been frequently described using such terms as *state failure*, *anarchy*, and *warlord economy*. The country is now divided into (at least) three (semi)autonomous regions on a de facto basis: Somaliland, which comprises the northwestern part of the country, has declared itself as a sovereign state ("Republic of Somaliland"), but its independence has not yet been recognized by any government. Puntland covers the northeastern part and has been self-governing since 1998 but does not seek independence. Large parts of southern Somalia have been controlled by the Islamist Al-Shabab militia, while the internationally recognized Transitional National Government controls the capital, Mogadishu, and some territory in the center of the country at present, which is currently (re)expanding with the support of outside forces.

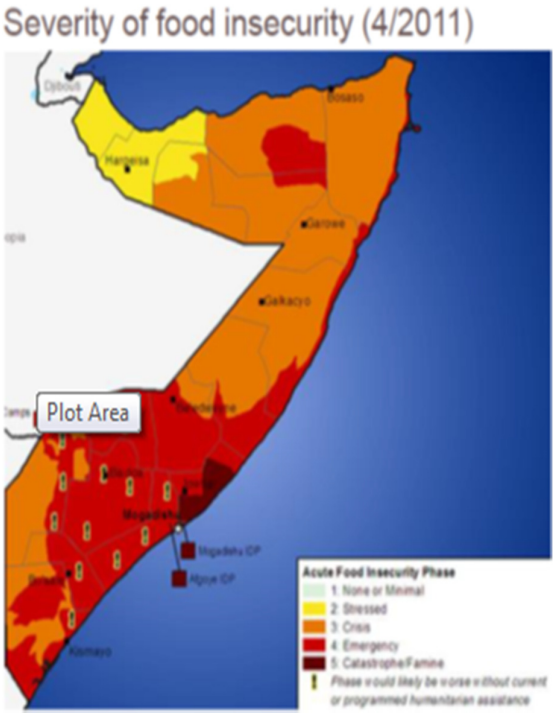
Although violent conflicts have occurred all over the country over the past two decades, the most recent conflict outbreaks have taken place in the central and southern parts and, in particular, in the Bay and Hiiraan regions (Figure 3.3). Those regions, where the Islamist Al-Shabab militia has been very active, are also the ones where food insecurity has been reported as the most acute after the intense and destructive droughts occurring in 2011. That correlation was puzzling enough to call for further investigation by some IFPRI researchers. We indeed know that weather shocks can have detrimental impacts on agricultural income through reducing crop yields (Schlenker and Lobell 2010) or livestock production (Seo and Mendelsohn 2007)

in Africa south of the Sahara, which could in turn affect the opportunity cost to participate in violence (Figure 3.3).

Figure 3.3 Geographic correlation between violent conflicts and drought damage



Source: ACLED (2011).



Source: FSNAU and FEWSNET (2011).

Maystadt and Ecker (2014) confirmed the relationship between extreme temperature and violence in Somalia between 1997 and 2009, using within-region variations (by means of a model with region and time fixed effects) and taking into account spatial dependency in the error terms. An increase in temperature anomalies and drought length by 1 within-region standard deviation increases the conflict likelihood by 62 percent, each component contributing half of that percent change (Table 3.3). Both the adopted model and the magnitude of the results are consistent with recent evidence showing a strong and systematic relationship between higher temperature and civil wars in Africa (Couttenier and Soubeyran 2014; Hsiang, Burke, and Miguel 2013; Hsiang and Meng 2014). However, little is known about the channels of transmission (Calderone, Maystadt, and You 2013).

Table 3.3 Conflict and cattle price changes (in percent) due to 1 within-region standard deviation increase in temperature anomaly and drought length

Regression	Reduced-form	Two-stage	
		First	Second
Dep. var.	Conflict	Cattle price (log)	Conflict
Temperature anomaly	30.3	–4.2	
Drought length	31.9	–1.9	
Combined drought effect	*62.1*	*–6.2*	
Cattle price (log)			71.6

Source: Maystadt and Ecker (2014).

To some extent, the structural causes of the civil insecurity are to be found in the deficiencies of the dictatorship imposed by Siad Barre, including lack of overall development; neglect of the rural economy and in particular the livestock sector (Mubarak 1997; Little 2003; Powell, Ford, and Nowrasteh 2008); and exclusion of certain clans from land and water rights (Besteman 1996) in a context of increasing competition over natural resources (especially water, grazing land, and farmland) between different stakeholder groups such as various pastoralist clans, nomads and (dispossessed) farmers, and residents and refugees (Shraeder 1986; Elmi 2010). Although such structural causes may explain social fractionalization among the Somali population, they are insufficient to inform about people's motivation to engage in civil strife. Maystadt and Ecker (2014) used a framework wherein people's motivation to participate in conflict is essentially driven by economic means, the so-called opportunity cost channel (Miguel, Satyanath, and Sergenti 2004). Hence, the determining factor is household income earnings from ordinary activities relative to the expected "income" sought from engaging in violent conflict activities. Because of the central role of livestock husbandry for (rural) income earnings and the lack of income (and consumption expenditure) data, Maystadt and Ecker (2014) used changes in livestock prices as a proxy for changes in household incomes. Livestock is likely to be a source of alternative income in pastoralist and agropastoralist communities in Somalia. During the two decades of absence of effective national governance, it is striking to observe the resilience of markets to violence. The informal economy continued to function relatively well, allowing for the exports of livestock (CIA 2011). Prior to the civil war, Somalia was the world's largest exporter of live goats (Headey, Taffesse, and You 2014). The livestock sector still accounts for about 40 percent of GDP and more than half of all export earnings (CIA 2011). The main importers of Somalia's exports are the Arab countries on the Arabian Peninsula, especially of live goats and sheep for the week of the hajj. Pastoralists (nomads) and semipastoralists, who are dependent on livestock for their livelihood, constitute a large share of Somalia's population. In a country with a rural population share of 63 percent (World Bank 2011b), the livestock sector provides food and income to more than 60 percent of the total population (FEWSNET 2011). Thus, pastoralism or semipastoralism is the source of livelihood for most Somalis in the rural areas, and a significant number of urban dwellers are also engaged in livestock-related activities, including trade in livestock and livestock products. Purely pastoralist livelihoods prevail in the northern and central parts of Somalia, and agropastoral livelihoods predominate in the southern part and some pockets of the northwestern and central areas (FSNAU 2011).

Overall, drought is a slow-onset and large-area disaster, and movements of livestock prices reflect herders' response to cope with it systematically. Drought causes market disequilibrium toward an oversupply of thin animals that significantly depresses livestock prices due to high quantities and poor quality (the less-fattened animals). Herders typically keep (do not sell) well-fed, vigorous animals since they are more likely to survive fodder shortages and to preserve genetic material of higher quality (Box 1971; Aklilu and Wekesa 2002; Morton and Barton 2002; Abebe et al. 2008; Aklilu and Catley 2009). Furthermore, the process of liquidating assets—including livestock—during drought appears to follow a particular order. More-liquid assets such as cereal stocks and small livestock are shed first, and less-liquid assets such as cattle and camels last (Mogues 2011).[7] Discharging more-liquid assets first is rational from an individual perspective, since markets for these products exist locally such that destocking and restocking is more practicable, and more-liquid assets can usually be better broken up into smaller tranches so that only the minimum amount needed for survival can be sold and the liquidation process stretched out as long as possible. Yet at the same time, the systematic liquidation of herds from many pastoralists simultaneously leads to depression of livestock market prices, thereby forcing households to sell off their animals at much lower prices during drought and consequently to have a much diminished purchasing power for food in order to cope with the drought. The downward price movement is amplified by strong asymmetry in market information during times of crisis, which exploitative livestock traders may take advantage of by offering undervalued prices. Naturally, herders have adopted strategies to cope with a recurrent phenomenon, but there is a general consensus that such coping strategies

[7] Livestock, and cattle in particular, are the most important assets in rural areas of the Horn of Africa. The size of the herd is considered as the ultimate indication of wealth, is critical for paying the bride price, and functions as insurance.

are breaking down due to a mix of factors such as limited mobility due to population growth, fragmentation of grazing lands, and fiercer water scarcity. Such factors have often led pastoralist people to settle in an environment unsuitable for such a livelihood, pushing them into a severe poverty trap when a major drought strikes.

Results from Maystadt and Ecker (2014) indeed support the idea of this pathway from temperature shocks to violence in Somalia. Using an instrumental variable, two-stage least squares, fixed-effect (IV-2SLS-FE) estimation shows the following sequence: a change by 1 within-region standard deviation decreases cattle prices by about 4 percent, which in turn results in an increase of 72 percent in the likelihood of conflict (Table 3.3). That impact is far from marginal since the same authors show an expected increase by about 50 percent of violence for Somalia by 2030, based on median scenarios from the Intergovernmental Panel on Climate Change (IPCC). Overall, the results are in line with the role of opportunity as a factor in resilience to conflict. Nonetheless, it does not mean the historical grievances (motivation) and the weak nature of the institutions (polity) are not necessary conditions for civil unrest. These dimensions are simply not captured by the monthly within-region variations exploited by Maystadt and Ecker (2014).The findings in Table 3.3 have several important policy implications for Somalia. First, increasing drought frequency and intensity, and the resulting conflict aggravation, call for urgent action to strengthen people's resilience to extreme weather shocks. Second, given the nexus between weather shocks, livestock price collapse, and conflict outbreaks, climate change adaptation needs to be considered as an integral part of conflict-prevention strategies, wherein pastoralist and semipastoralist livelihoods deserve special attention. Third, to improve people's resilience to weather shocks and to lower the incentive for participating in conflict "sustainably," alternative income sources and therefore economic growth and diversification are needed, in addition to social protection mechanisms (see Calderone, Maystadt, and You [2013] for more specific recommendations). Ultimately, poverty reduction is a key factor in conflict prevention. Yet the lack of national governance currently limits the range of feasible policy options, particularly with respect to implementation of public safety net measures through national income redistribution. Fourth, early market interventions from the demand side and improvements in the functioning of local livestock markets to slow down the deterioration in livestock prices offer alternative paths to reducing income loss for herders and thus mitigating the risk of conflict. For instance, market information asymmetry may be cut down through expansion of communication networks and services, realized by the private sector with support of international development partners. And efforts to better integrate and diversify Somalia's meat supply chain through investments in road infrastructure, slaughterhouses, and cold-storage warehouses, for example, may contribute toward smoothing the destocking process of herds and reducing the animal death toll during droughts. Fifth, introducing and expanding credit and insurance markets may help herders to better cope with droughts through avoiding liquidation of their herds and, more importantly, through easing the restocking of herds. Sixth, herders may need financial and technical support to adjust their herds toward more drought-resistant and earlier-marketable animals in order to be better prepared for more frequent and intense droughts in the future. On the research side, little is known about the effectiveness of different interventions to enhance resilience to weather shocks and conflict in pastoralist areas. At least, preliminary results call for more research and scientific validation in that field.

BOX 3.1 BUILDING RESILIENCE TO CONFLICT THROUGH DEVELOPMENT PROJECTS: EXPERIENCE FROM DEVELOPMENT PRACTITIONERS

During the recent IFPRI-IFAD (International Fund for Agricultural Development) workshop that took place in Sana'a on April 9, 2013, IFAD and its other development partners shared experiences about the challenges that they face in realizing their project goals and objectives, especially when building resilience to conflict. They also provided recommendations on how to overcome these challenges from a more practical perspective. Several overarching messages came out of the proceedings: that all development projects should (1) be part of a comprehensive development strategy, (2) improve geographic targeting and perform peace and conflict assessments in those targeted areas, and (3) allocate the projects' scarce resources to benefit those most deserving and not those who stand to make personal gains.

The first message focused on the fact that at the onset, all development projects have to have an established cohesive framework for intervention and operate within a broad national development strategy. Overall, the project goals and objectives need to be aligned with the national and subnational goals and objectives. Project priorities also have to be well defined and aligned, and communicated by the government to the people in order to maximize buy-in at the individual level for successful participation. Furthermore, not only are sufficient financial and human resources important for the proper support of the projects, but providing financial resources to cover the medium to longer terms, even after the project ends, is imperative for continuity. Adding to that, the lack of complementary synergies between emergency response projects and development efforts may serve to hamper development. Even though acute needs arise, however, addressing ongoing development challenges needs to be at the core of project design and implementation so it is not pushed aside. One other message that arose was the need to improve targeting at the geographic, village, and household levels. Most experts agreed that it was far preferable to focus on one area and intensify activities there—so that interventions are both effective and significant—than to tackle several areas at once. Sometimes, however, low social cohesion in most of the regions makes such targeting exercises difficult and may actually contribute to eliciting further conflict between communities and even within villages. That fact points to why peace and conflict assessments are necessary at the onset not just for the design of the project but also to enhance partnerships with the private sector, which is increasingly being recognized as an important development partner.

Following from the above, the development professionals concurred that projects should preserve and build upon existing social capital and indigenous systems for conflict resolution and coping with shocks. One final key point brought up was the need to properly allocate resources among the different communities in order to make sure that these resources reach those most in need and not those who stand to make personal or village gains. To make that goal attainable, there needs to be a feedback channel from the public to the project owners to assure accountability and responsibility for all stakeholders involved.

Source: IFPRI-IFAD workshop "Decreasing Vulnerability to Conflict in MENA through Rural Development," Sana'a, Yemen, April 9, 2013. Unpublished notes by P. Al-Riffai.

SUDAN: CLIMATE CHANGE, NATURAL RESOURCES, AND LOCAL CONFLICTS

Sudan experienced two civil wars after its independence in 1956; however, it also has a history of repeated conflict events starting well before its independence. Like many African conflicts, the Sudan conflict took root in the colonization period.[8] Most scholars have agreed that the divide between the North and the South was fueled by the British colonizers, who favored social and economic investment in the North under the so-called Southern Policy implemented between 1920 and 1947 (Ali, Elbadawi, and El-Bathani 2005). After independence, this structural divide was exacerbated when the Northern elite came into power, leading to 17 years of civil war (known as the first civil war) between the North and the South. A peace settlement, the Addis Ababa Peace Accord, was reached in 1972, but then-President Nimeri aggravated grievances in the South by redesigning the border to include oil-producing areas in the North's territory, by grabbing land through the development of mechanized farming, and by exploiting the divisions between various groups within the South. As a result, the Sudan People's Liberation Army/Movement (SPLA/M) was created in 1983 with external support from Ethiopia. The second Sudanese civil war was then triggered as a continuation of the first civil war and lasted until 2005, when it ended with the signing of the Comprehensive Peace Agreement, which paved the way for a referendum in January 2011 and the independence of South Sudan in July 2011. The political turmoil experienced since then makes the transition hazardous, to say the least. Although the exact figures are subject to debate (Duffield 2001), the dramatic history of violence in Sudan resulted in more than 1.9 million civilian deaths between 1983 and 1998 (more than 600,000 since 1993, according to Burr [1998]) and about 5 million displaced people (UNEP 2007).

Behind this national scene and the description of the civil war as an opposition between the North and the South, local conflict events also multiplied within North and South Sudan (Johnson 2011). The exploitation of resources, once a source of warfare financing, became a warfare objective in itself.[9] At the same time, conflict events evolved from ethnic tensions between the North and the South to local or regional conflicts increasingly reported to be linked to environmental factors. A study by the United Nations Environmental Program (UNEP) was certainly instrumental in maintaining that "competition over declining natural resources was one of the underlying causes of the conflict" and in pointing to four specific conflict-contributing categories of natural resources: "oil and gas reserves, Nile waters, hardwood timbers, and rangeland and rainfed agricultural land (and associated water points)" (UNEP 2007, 70). In particular, in marginalized areas, conflict was intensified by the expansion of large semimechanized farms and the subsequent loss of access to land for both smallholders and pastoralists (Keen and Lee 2007). Keen and Lee (2007), for example, reported that the area of land taken up by rainfed, semimechanized agriculture increased from about 2 million feddans (0.84 million hectares) at the beginning of the 1970s to 14 million feddans (5.88 million hectares) by 2003.

In addition to land and water scarcity, pastoralist and agropastoralist communities have been increasingly under pressure as a result of population growth and the more frequent and intense droughts. In Sudan, agriculture—which accounted for 30–40 percent of GDP between 1996 and 2010 and employs about 80 percent of the population (Benke 2012)—remains extremely vulnerable to droughts, while the climatic conditions appear to have become harsher to cope with. According to UNEP (2007), an estimated 50 to 200 km southward shift of the boundary between desert and semidesert has occurred since the 1930s, and the remaining semidesert and low-rainfall land are at considerable risk of further desertification. Thus, the vulnerability of semiarid areas to climatic stresses and shocks is more likely to intensify in the decades to

[8] Johnson (2011) even pointed to an exploitative relationship that the Turco-Egyptians established between the centralizing power of the state and the peripheries (including South Sudan) before the 19th century, mainly through the institutions of slavery and slave trading. Such historical factors echo the findings by Nunn (2008) on the legacy of the slave trade for contemporaneous economic development.

[9] As P. A. Nyaba wrote in *The Politics of Liberation in Sudan: An Insider's View*, the SPLA/M, "instead of being a genuine national liberalization movement, degenerated into an agent of plunder, pillage and destructive conquest" (quoted in Ali, Elbadawi, and El-Bathani 2005, 202).

come. Moreover, the link between resource scarcity and conflict is far from trivial. Scholars and policymakers have considered resource scarcity as the key cause of incentives for conflict (Homer-Dixon 1994), especially for Sudan and other pastoralist communities (UNEP 2007; Hendrickson, Armon, and Mearn 1996); but detrimental weather shocks may also reduce the value of the resources that are fought over. In particular, Butler (2007) and Kevane and Gray (2008) argued that weather patterns only weakly corroborated the claim that climate change caused the Darfur conflict; they concluded that the UN overestimated the case. Certainly, there is still much to understand about which conditions make the link between resource scarcity and conflict hold in one direction or another. As suggested by Maystadt and Ecker (2014) and Calderone, Maystadt, and You (2013), there is a need to identify the mechanisms behind the climate-conflict nexus that has been recently established (Hsiang, Burke, and Miguel 2013; Hsiang and Meng 2014).

Calderone, Maystadt, and You (2013) sought to fill that knowledge gap by shedding light on the validity of the climate-conflict nexus in arid and semiarid lowland (ASAL) areas in North and South Sudan. Using within-pixel variations (with pixel and time fixed effects and with specific trends and correction for spatial dependency), the authors found a strong relationship between temperature shocks and interpersonal violence. A change in temperature anomalies by 1 standard deviation increased the frequency of violent conflict by 32 percent (very similar to what Maystadt and Ecker [2014] obtained for the same variable in the case of Somalia). In turn, the risk is expected to magnify by a range of 24 to 31 percent by 2030, using the median IPCC scenarios. But of more interest is that the authors shed light on the vulnerability of pastoralist and agropastoralist livelihoods in ASAL areas in North and South Sudan. Calderone, Maystadt, and You (2013) suggested that against alternative hypotheses, competition between herders and farmers over natural resources, and in particular over water availability, exacerbates the strong relationship between temperature shocks and violence in North and South Sudan.

Several recommendations on how to enhance resilience to weather shocks and conflict in North and South Sudan, and in particular in ASAL areas, are detailed below.[10]

Improved access to markets, as well as better information, insurance, and credit markets, would help herders to destock and restock during times of drought. The stocking and destocking behavior of pastoralists in drought periods may appear rather irrational to external observers. For instance, Headey, Taffesse, and You (2014) noted that pastoralists prefer expanding and keeping their herds even though they are aware that a large proportion of their animals will die in the upcoming drought. Such behavior may point to the problem of a malfunctioning market rather than irrationality, social status, or cultural norms. Market interventions and improvements in the functioning of local livestock markets could attenuate the deterioration in livestock prices, thus minimizing herders' income loss and their incentives to participate in violence. This idea was supported by McPeak (2004), who suggested that improved output markets have important implications for households' capacity to confront both income and asset shocks.

Access to the market may help in smoothing out the destocking process of herds, thereby reducing the animal death toll during droughts. Poor road infrastructure in the Horn of Africa region is often highlighted as a major constraint for pastoralists to access markets (Bailey et al. 1999; Mahmoud 2003). For instance, building a road network as well as marketplaces in ASAL areas could facilitate the transport of animals from drought-stricken areas to the different markets (HPG 2009), thus facilitating pastoralists' destocking process. Improved infrastructure would also allow smallholder farmers and pastoralists to have consistent access to input and produce markets, and thus open opportunities for off-farm income sources and livelihood diversification (McPeak 2004; Alinovi et al. 2010). Furthermore, improved infrastructure could enhance the competitiveness

[10] Little and McPeak (forthcoming) provide a more detailed description of the challenges (such as land loss, population growth, violence, and climate variability) faced by pastoralists in ASAL areas.

BOX 3.2 ENHANCING RESILIENCE TO DROUGHTS: A PRACTICAL EXAMPLE OF AN IFAD INTERVENTION IN SUDAN

Um Ruwaba and Bara are two of the four provinces that make up the semiarid state of North Kordofan in western Sudan. The major productive occupations—rainfed cropping, livestock rearing, and utilization of rangeland and forest products—are dependent on rainfall, which is low and unreliable; soil fertility, which is generally poor; and the state of rangeland vegetation and forest cover. Irrigated farming is only possible in a limited area in the south of Um Ruwaba and on a small scale using wells in Bara.

A series of droughts in the 1980s and early 1990s devastated livelihood systems. What is more, immigration was taking place from areas to the south affected by civil strife. In the late 1990s, systems were recovering following a succession of favorable seasons. However, during the same time the government carried out a self-imposed reform program, which resulted in major imbalances in the economy. Against this background, in 2000 IFAD launched the North Kordofan Rural Development Project to improve the standard of living of the local communities, in particular to help ensure their food security and enhance their resilience to drought and other natural disasters.

Farmers from 25 villages in the rural administrative unit of Al-Rahad in Um Ruwaba participated in assessing their needs. First, they identified the main problem: agricultural productivity in areas where rainfed crops are cultivated—especially sorghum, which is the main food crop for the population—is very low because of insufficient rain (around 300 mm per year) and because *gardood*, as the local soil is called, is so solid and impermeable that crops cannot absorb the rain. The farmers then identified potential solutions: with the support of Sudan's Agricultural Research Corporation and the Food and Agriculture Organization of the United Nations (FAO), they developed a water harvesting technique that increases agricultural productivity significantly. Chisel ploughs are used to excavate soil to a depth of 25–30 cm—to increase the permeability of the soil—and shields (dust barriers) of approximately 60 cm are erected—to retain the water so that the soil can become saturated.

In addition to disseminating this new water harvesting technique, the project also helped develop marketing strategies that allowed farmers to achieve a reasonable profit margin. In particular, the project (1) promoted a warehouse-receipt program whereby farmers were supported to acquire loans from the village funds, in exchange for storing the harvest in the village store until prices increased; (2) provided farmers with information about crop prices in local markets through field counselors, and advised farmers to listen to market information broadcasts via radio; and (3) promoted gathering the harvests of several small farmers together in order to increase their bargaining power and ability to sell products in nearby cities.

As a result, thousands of farmers have adopted the water harvesting technique; the average sorghum productivity has increased up to 11 times, from 77 to 840 kg/feddan (32 to 353 kg/ha); household incomes have increased by 41 percent; and the incidence of rural poverty in the project area was reduced by 50 percent.

Source: IFAD (2013).

of pastoralists in more remote areas by decreasing their overall net costs of livestock production. Based on empirical evidence from the beef industry in several African countries, Iimi (2007) suggested that some increase in net value can be achieved by investment in infrastructure, especially transportation, which would reduce marketing costs.

Interventions should also include improving the access to market information. There is a general consensus among development practitioners and researchers that livestock marketing information influences decisions to sell livestock not only for local consumption but also through the market chain. Better access to market information would enable herders to generate more income and thus contribute to poverty alleviation and enhance household resilience (Mahmoud 2001; AGREF 2005). Unequal access to information clearly benefits wealthier pastoralists in a dynamic trading environment where prices and demands are constantly changing. The actors who are best informed are those who can most easily pass on costs and maximize profits (Aklilu and Catley 2009); at the same time, access to better market information also reduces the risks in

marketing (Bailey et al. 1999). In fact, Barrett, Bellemare, and Osterloh (2006) noted that wealthier pastoralists tend to engage in livestock transactions more frequently and appear more responsive to livestock price changes than the poorer groups. Therefore, improving market information should enhance the resilience of pastoralists in East Africa. As an example, in 1997 in highland regions of Ethiopia, a national livestock market information system was established for that purpose (the Livestock Information Network and Knowledge System of the Global Livestock Collaborative Research Support Program). Jama and colleagues (2006) conducted a rapid assessment of this system, finding that in most of the highland market transactions, buyers and sellers deal directly with each other without the involvement of brokers, which makes the provision of market information to the producers particularly beneficial in order to level the playing field. They also reported that most traders and producers interviewed showed significant interest in receiving market information not only about the local markets but also about far-off central and terminal markets throughout the country, which confirms that such a tool would be highly relevant for many actors in the livestock sector and for the functioning of livestock markets.

Introducing and expanding credit and insurance markets may help herders better cope with droughts by helping them avoid unnecessary herd liquidation and, more importantly, by easing their burden of restocking their herds. Given that high climate variability is expected to persist in ASAL areas in the foreseeable future (Williams and Funk 2011), index-based insurance products emerge as a promising option for mitigating climate-related risks among vulnerable households (Hellmuth et al. 2007, 2009; Barrett et al. 2007). The rationale behind index-based insurance is to compensate clients in the event of a loss, thus offering policyholders a payout based on an external indicator that triggers a payment to all insured clients within a geographically defined space. A salient feature of this type of program is its transparency, since it would be based on the realization of an outcome that cannot be influenced by insurers or policyholders. A number of countries in Asia, Africa, and Latin America have successfully implemented crop-related pilot programs (Barnett and Mahul 2007); however, little can be said of their long-term viability. For ASAL areas of the Horn of Africa, Notenbaert and colleagues (2010) suggested that an index-based livestock insurance system (based on levels of rainfall and livestock mortality) could be a suitable tool to protect pastoralists against weather shocks. In particular, based on a plan that uses a vegetation index and rainfall to predict theoretical livestock mortality (McPeak, Chantarat, and Mude 2010; Chantarat et al. 2013), the International Livestock Research Institute has implemented an insurance product aimed at protecting livestock keepers from drought-related asset losses, particularly those in the drought-prone ASAL areas. The efficiency of this intervention is promising, but the plan remains under study.[11]

Herders may need financial and technical support to adjust the composition of their herds toward drought-resistant and marketable animals in order to be better prepared for more frequent and intense droughts in the future. Poor pastoralists should have access to loans for livestock production and livelihood protection because such loans can play an important role for vulnerable households during times of stress (HPG 2009). Access to credit may not only serve as a buffer to weather shocks but may also promote asset accumulation. In Sudan, direct loans to poorer herders were shown to have a positive impact on herd sizes among the beneficiaries (Aklilu and Catley 2009). The same study also demonstrated that poor pastoralists can be bankable in livestock and that flexible systems involving peer-group pressure and guarantees by village chiefs, pastoral associations, or cooperatives can substitute for conventional collateral (Aklilu and Catley 2009).

Resilience to weather shocks and conflict also calls for investing outside of the livestock sector in order to promote income diversification. The FAO, UNICEF, and WFP (2012) have identified three interlinked groups of strategies that promote resilience in the Horn of Africa: (1) strengthening the productive sectors, (2) improving basic social services, and (3) establishing productive safety nets. Strengthening productive sectors involves facilitating access to physical assets for production and to technologies that enhance productivity, as well as

[11] See http://livestockinsurance.wordpress.com/ for details.

facilitating the diversification of production and income sources. A vast literature highlights the benefits of livelihood diversification on household vulnerability through enhanced income and improved risk mitigation (Ellis 2000; Reardon et al. 2000; Haggblade, Hazell, and Reardon 2007; Paavola 2008). Little and others (2001) showed that this relationship is likely to also hold true in pastoralist areas. In many parts of eastern Africa, pastoral households with higher levels of education also have higher incomes and are more food secure, partly because household members earning income from off-farm sources also remit a portion of their income (McPeak and Little 2004). However, diversification may also come at a cost. Paavola (2008) highlighted that diversification in pastoral areas can also heighten the stress on forest, soil, and water resources, which may exacerbate households' capacity to cope with weather shocks in the future, particularly among pastoralist communities who have limited access to markets and public services. Nevertheless, policies and interventions that promote livelihood diversification and economic transformation can play a key role in building resilience to weather shocks in the Horn of Africa; livelihood diversification and participation in markets can be promoted by government policies or donor interventions that support education and skills training, as well as those that promote access to credit (Frankenberger et al. 2012). Agricultural intensification in agropastoral areas can be improved by the provision of agricultural extension services and farmer field schools for adoption of technologies such as improved seeds, fertilizer, small machinery, and so on. The literature also highlights the role of improving access to markets and information by building transportation, market, and communication infrastructure as a way to reduce vulnerability to asset shocks and enhance resilience by allowing smallholder farmers and pastoralists to have consistent access to input and produce markets and to diverse income streams (McPeak 2004; Alinovi et al. 2010).

Second, there is evidence suggesting that the provision of basic services (health, education, security) in remote areas characterized by interethnic and cross-border violence as well as the chronic vulnerability to food insecurity can contribute to peace building and longer-term resilience (Frankenberger et al. 2012). Therefore, promoting access to education is considered as one the most effective investments because it overlaps and complements other strategies that seek to enhance resilience. Given that the current age structure in Sudan (and in eastern Africa in general) is heavily skewed toward the younger cohorts, and given the high prevalence of illiteracy, especially in pastoralist areas, we can expect such interventions to have significant impact (McPeak, Little, and Doss 2011; Headey, Taffesse, and You 2014). The effects of improving the human capital of vulnerable households are far-reaching inasmuch as they are also associated with better health and nutrition outcomes, more empowered individuals, and communities with more gender equity. These outcomes are especially true in the Horn of Africa, where women and girls are often barred from reaching their full potential due to limited access to education and income opportunities, unequal access to land and other productive resources, and discriminatory social practices that limit their rights and ability to fully participate in society. The provision of basic services also involves interventions that can directly promote better health outcomes, such as access to safe drinking water; community-based health and nutrition services (including surveillance); and access to nutrition, health, and education facilities. Access to better public health services can have significant impacts on the health and well-being of individuals and thus enhance the adaptive capacity of vulnerable households (Frankenberger et al. 2012).

Finally, establishing productive safety nets involves providing predictable sources of income to vulnerable households through various means, such as cash transfers, food transfers, or paid labor within a public works program. Safety net programs have shown potentially positive outcomes in mitigating the effects of weather shocks on household food security and child nutritional status in the Horn of Africa (Quisumbing 2003; Dercon and Krishnan 2004; Yamano, Alderman, and Christiaensen 2005). Gilligan and Hoddinott (2012) examined the impact of emergency food aid programs after the 2002 drought in rural Ethiopia on future welfare. They found that a food-for-work program benefited the better-off households, while well-targeted food transfers benefited the poorest. Evidence suggests that food aid received in the first 12 months after a drought has cumulative and persistent effects. Nonetheless, scaling up these programs in pastoralist areas remains challenging. A recent study identified some of these challenges, such as inadequate training of those in charge of implementing the programs; difficulty in reaching a dispersed and mobile population in an environment

with poor infrastructure and security concerns; and potential difficulty in targeting the poor who belong to traditional structures, such as clans that follow different norms and practices (Sabates-Wheeler, Lind, and Hoddinott 2013). There is evidently a need to design better social protection programs for fragile or conflict-prone areas, so more research seems to be needed in that respect.

4. CONCLUSIONS

Food insecurity at national and household levels not only is a consequence of conflict but can also cause and drive conflicts. Thus, this paper makes the case for an even higher priority for food security–related policies and programs in conflict-affected and conflict-prone countries. Such policies and programs *build resilience to conflict* insofar as they are expected not only to help countries and people *cope with* and *recover from* conflict but also to contribute to *preventing* conflicts and support economic development more broadly—that is, help countries and people *become even better off*.

Building resilience at the national level of food security requires country-specific policies and a state that includes its citizens in the decisionmaking processes and provides adequate services (the *polity* dimension). Household-level resilience can be further enhanced through specific programs, from either governments or international partners, to address factors related to the *motivation* to participate in conflicts and the *opportunity costs* to do so. Such programs will have to make a contribution toward reducing poverty and malnutrition and create employment in order to build resilience to conflict.

Several lessons emerge from the four case studies in combination with the related literature:

- Conflicts often occur together and are related to other shocks such as economic crises, price shocks, natural disasters, and the like. In the cases of Egypt and Yemen, conflict was preceded by and likely related to a series of economic shocks, including the 2007–2008 and 2011 global food price spikes. The cases of Sudan and Somalia show that droughts can fuel ongoing conflicts by *lowering* prices (caused by the simultaneous sell-off of livestock), leading to lower opportunity costs for young men to participate in conflicts. Such interdependencies between different types of shocks often lead to "complex emergencies" and need to be considered in policy and program design.

- Increasing subsidies is a favorite policy measure in times of crisis, which helps keep poverty and food insecurity levels lower than they would be without subsidies. However, such measures do not qualify as resilience building because they are not expected to help countries *become better off*. The cases of Egypt and Yemen show that rising subsidies not only have contributed to growing budget deficits but also were not well targeted and, in the case of Egypt, may have contributed to the double burden of malnutrition. Going forward, reforming subsidy systems (for example, by making them more efficient) would lead to savings that could be invested in more targeted food-security and nutrition interventions as well as job-creating initiatives in poorer areas. This in turn may contribute to creating more opportunities, especially for young people, reducing their motivation for participating in conflict.

- Climate change adaptation should be an integral part of conflict prevention and food-security strategies in part because climate change is expected to significantly increase the likelihood of conflict in the future. The cases of Somalia and Sudan suggest that, for improving people's resilience to weather shocks and lowering the incentive for participating in conflict sustainably, alternative income sources and therefore economic growth and diversification are needed.

- In addition, price information systems, the introduction and expansion of credit and insurance markets, and geographic targeting of social safety nets may help people better cope with droughts and related price shocks.

- Building functioning and effective institutions is essential for building resilience to conflict. In the case of Somalia, the lack of national governance currently limits the range of feasible policy options, particularly implementing public safety net measures through national income redistribution. In the case of Yemen and other countries, reducing corruption and improving accountability and transparency will be critical in addressing some of the issues that exacerbated tensions and caused the conflict during 2011.

Finally, several important knowledge and research gaps remain. Analysts have made considerable progress in understanding the impact of conflict on food security or the reverse relationship. Nonetheless, the focus on identification in quantitative analysis may have caused researchers to overlook very significant questions for conflict resolution. The political economy of conflicts is not well understood. For instance, we know very little about the role of leaders in favoring a peaceful transition, the potential coalition between different groups in favor of peace or conflict, the impact of decentralization on political stability, the sequence of reforms in a transition process, or the leverage of external actors (donors, civil society, peacekeeping missions, and so on) in favoring democratic transition. From a policy point of view, little evaluation is made on the design of conflict-preventive interventions. For instance, food aid has been found to feed conflict (Nunn and Qian, forthcoming; Besley and Persson 2011) but little is known about the efficiency of other interventions in conflict-prone areas. Given the high costs for economic development, we need to better understand how best to help some countries escape the vicious circle of violence. Surprisingly, little research has been devoted to the efficiency and complementarity of military operations. Very little is also known on how best to contain the escalation of violence from low-intensity to high-intensity events. As pointed out in the case of Sudan, the vulnerability of some groups (for example, pastoralist communities) also raises the question of the efficiency of social protection interventions in terms of not only supporting the most in need but also strengthening the sustainability of long-term recovery. Additional implementation challenges may relate to the integration of returnees (either refugees or internally displaced persons) and ex-combatants. Interventions need to be sensitive to the potential conflicts among these different groups, and they need to be designed in ways that promote reintegration and postconflict reconciliation, rather than contribute to new conflicts (Mabiso et al., forthcoming).

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